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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,633	12/09/2003	Toshikazu Hamamoto	054160-5015-02	4718
7590 08/30/2006 MORGAN, LEWIS & BOCKIUS LLP 1701 Market Street Philadelphia, PA 19103			EXAMINER DOVE, TRACY MAE	
			ART UNIT	PAPER NUMBER
			1745	
DATE MAILED: 08/30/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/731,633

Applicant(s)

HAMAMOTO ET AL.

Examiner

Tracy Dove

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 June 2006.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 26,27 and 30-33 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 26,27 and 30-33 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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### **DETAILED ACTION**

This Office Action is in response to the communication filed on 6/26/06. Applicant's arguments have been considered, but are not persuasive. Claims 26, 27 and 30-33 are pending. This Action is made FINAL, as necessitated by amendment.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 26, 27 and 30-33 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 26 recites a lithium secondary battery comprising a non-aqueous liquid electrolyte including divinyl sulfone. However, the specification does not provide support for a lithium battery including a liquid electrolyte comprising divinyl sulfone. The specification states the divinyl sulfone forms a passivation film at the surface of the anode (carbonaceous material) (0015). It is unclear how "liquid" divinyl sulfone forms a "passivation film" at the anode surface. Furthermore, the specification does not recite a lithium secondary battery comprising "a liquid electrolyte".

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claims 26, 27 and 30-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 26 is a product claim directed toward a lithium secondary battery, not a method claim. Thus, the added limitation “wherein during charging of the battery, the divinyl sulfone forms a film at a surface of the carbonaceous material” is indefinite because the claim recites the divinyl sulfone is a “liquid”. The divinyl sulfone cannot be a liquid and a solid (film) in the same product claim. See 112, 1<sup>st</sup>, rejection above.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 26, 27 and 30-33 are rejected under 35 U.S.C. 102(b)/103(a) as being anticipated by, and alternatively unpatentable over, Kato, JP 09-082360, as evidenced by Linden, Handbook of Batteries.

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Kato teaches a nonaqueous electrolyte secondary battery comprising a positive electrode, a negative electrode and an electrolyte (0019). The electrolyte includes an electrolyte salt and a nonaqueous solvent (liquid electrolyte). The salt may be LiBF<sub>4</sub> and the solvent may be ethylene carbonate, propylene carbonate, butyrolactone, dimethyl carbonate, diethyl carbonate or mixtures thereof (0046-0048). A compound which forms a layer on the positive electrode is added to the electrolyte (0039). An electrolyte comprising 10 wt% of the compound is prepared by adding 20 wt% of a vinyl sulfone to the electrolyte solution (see NIST printout that states "vinyl sulfone" is another name for "divinyl sulfone"). The negative electrode material may be coke or graphite (0044-0045). Coke has an interlayer spacing d<sub>002</sub> of 0.346 and graphite has an interlayer spacing d<sub>002</sub> of 0.334-0.335 nm. This is evidenced by Linden, Handbook of Batteries, at Table 36.3 on page 36.6. Kato teaches vinyl sulfone was added to a solution for the electrolyte (0078).

Thus the claims are anticipated.

The claims are alternatively unpatentable. The courts have ruled that product-by-process limitations, in the absence of unexpected results, are obvious. The divinyl sulfone of the claimed invention forms a film (not in liquid form).

\*

Claims 26, 27 and 30-33 are rejected under 35 U.S.C. 102(a) as being anticipated by Hamamoto et al., JP 11-329494.

Hamamoto teaches an electrolytic solution for a lithium secondary battery wherein the electrolytic solution includes an electrolyte dissolved in a nonaqueous solvent and a vinyl sulfone derivative of the formula shown in the abstract. In the formula R may be an alkyl group or an alkenyl group. The sulfone derivative may be a divinyl sulfone (paragraph 0013). The

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vinyl sulfone derivative is 0.1-10 wt% of the electrolytic solution (paragraph 0014). The various solvents and electrolyte of the instant claims are disclosed in paragraphs 0015-0018. The lithium battery includes a positive electrode and a negative electrode wherein the negative electrode includes graphite having a (d002) spacing of the (002) plane of 3.35-3.40Å (0.335-0.340 nm). See paragraph 0022. Hamamoto has a specific teaching of an electrolytic solvent mixture comprising propylene carbonate and dimethyl carbonate (paragraph 0024). See also Table 1.

Thus the claims are anticipated.

### ***Response to Arguments***

Applicant's arguments filed 6/26/06 have been fully considered but they are not persuasive.

Regarding the 35 U.S.C. 112, 1<sup>st</sup>, rejection, Applicant argues the specification contains numerous references to the fact that the battery of the invention contains a liquid electrolyte. However, the specification never states the divinyl sulfone is a liquid. Applicant has not addressed that Examiners position that it is unclear how "liquid" divinyl sulfone forms a "passivation film" at the anode surface. The nonaqueous solvent with the salt dissolved therein is the battery electrolyte, not the divinyl sulfone.

Regarding the 35 U.S.C. 102/103 rejection, Applicant argues Kato teaches a solid electrolyte, which is unlike the claimed invention wherein the divinyl sulfone is contained in a liquid electrolyte. However, Kato teaches the positive electrode and negative electrode are separated by a polypropylene film (0060). Polypropylene is not an electrolyte material, but is a conventional separator material for liquid electrolyte lithium batteries. Furthermore, the specification teaches the divinyl sulfone "has a function of forming a passivation film" (page 4,

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lines 15-18). Thus, the divinyl sulfone is not contained in a liquid electrolyte when contained in the battery. Furthermore, Kato teaches an electrolytic solution comprising a lithium salt dissolved in a nonaqueous solvent (liquid electrolyte) [0046-0048]. The divinyl sulfone of Kato, like that disclosed in the instant specification, forms a film. See also paragraph 0078. Examiner requests Applicant explain how the divinyl sulfone of the claimed invention when mixed with a first solvent or a first solvent mixture and  $\text{LiBF}_4$  is a "liquid" in the battery and the divinyl sulfone of the prior art when mixed with the same first solvent or first solvent mixture and  $\text{LiBF}_4$  is a "solid" in the battery, as asserted by Applicant.

Note product-by-process limitations, in the absence of unexpected results, are not given patentable weight. Applicant is not claiming a method, but is claimed a product.

Applicant argues Hamamoto is not available as prior art against the claimed invention because Applicant is entitled to the priority date of 7/13/99 of JP 11-198351. Applicant cannot rely upon the foreign priority papers to overcome this rejection because all claim limitations are not supported by the translation of the foreign document. Specifically, a liquid electrolyte comprising divinyl sulfone is not supported.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

August 28, 2006



**TRACY DOVE**  
**PRIMARY EXAMINER**